

This invention relates to remote controlled power chain saw, more particularly, the invention relates to remotely positioning a power chain saw at selected various angles and heights.

It is an object of the invention to provide a novel remote controlled power chain saw with a power positioning mechanism to enable the chain saw to be positioned at a selected angle and height and operated for cutting objects with the saw at the selected position.

It is another object of the invention to provide a remotely controlled chain saw having a positioning mechanism to pivot the saw about at least two axes perpendicular to one another.

It is a further object of the invention to provide a novel remote controlled power chain saw which can be remotely positioned longitudinally and pivoted axially about the longitudinal path as well pivoted about two additional axes at different perpendicular angles to the longitudinal path.

It is another object of the invention to provide a novel remotely controlled power saw which can be remotely positioned about various different axes and along different locations along a path.

It is another object of the invention to provide a mobile remotely controlled chain saw on telescoping boom of a vehicle for remotely positioning the chain saw on a telescoping boom of the vehicle and for operating the chain saw when positioned on the boom..

Further objects and advantages of the invention will become apparent as the description proceeds and when taken in conjunction with the accompanying drawings wherein:

Brief Description of the Drawings:

Figure 1 is a side elevational view of the remotely controlled chain saw mounted on a telescoping boom of a power vehicle.

Figure 2 is a top plan view of the remotely controlled chain saw on a telescoping boom of a vehicle.

Figure 3 is an enlarged side elevational view of the remote controlled chain saw.

Figure 4 is an enlarged top plan view of the remotely controlled chain saw.

Figure 5 is a view taken along line 5-5 of Figure 3.

Figure 6 is a cross sectional view taken along line 6-6 of Figure 3.

Briefly stated, the invention comprises a remote controlled power chain saw having a main saw frame, and a rear saw frame. An endless chain and cutting teeth on the endless chain is pivotally mounted to the main saw frame to pivot about one axis, to pivot the endless chain out of its housing for operative use. The endless chain and its cutting teeth and main saw frame are also pivotally mounted about a second axis, perpendicular to the first axis, relative to the rear saw frame, to pivot the endless chain at an angle relative to the rear saw frame. The rear saw frame is detachably mounted to the forward telescoping sleeve of a telescoping boom, and the telescoping boom at its rear end is pivotally mounted to the forward end of a mobile vehicle, whereby the telescoping sleeves of the telescoping boom may telescope the power chain saw longitudinally forward relative to the mobile vehicle and the the pivotal mounting of the rear end of the boom may pivot the telescoping boom and endless chain and cutting teeth upward about axis of the rear end of the telescoping boom to the mobile vehicle.

Brief Description of Preferred Embodiment:

Referring more particularly to the drawings, in Figures 1 and 2, the remote controlled power chain saw invention 20 is illustrated. The saw invention 20 has a front housing 28 and a rear end assembly 31.

In the front housing 28 is a conventional endless chain 21 with cutting teeth 21' mounted on the chain. A pair of gears 22 and 22' rotatably support the endless chain 21. Gear 22' is rotatably mounted on the outer end of the center plate 23. A hydraulic motor 24 is mounted on the main plate 23' and its output shaft 24' rotated relative to the plate 23' with the outer end of the shaft having the gear 22' fixed coaxially to the shaft 24' and the motor and its shaft rotatably drives the gear 22' and thereby drives the gears 22 and 22' and thereby drives the chain 21 about the gears to operate the chain saw.

The front housing 28 has three upright walls 28', 28'', and 28''' with an open bottom 28'''' between walls 28' and 28'' for the chain 21 to pivot down and out of the housing 28 for use. The mounting plate 23' is pivotally mounted to the middle wall 28'' of the front housing 28 by a pin 26 and serves as a mounting plate for mounting the chain saw thereto. The pivoting of the mounting plate 23' on its pin 26, relative to the housing also pivots, relative to the housing, the chain 21 upward and downward about the pin 26, as well as the center plate 23, the gears 22 and 22' and motor 24. The clockwise pivoting of the mounting plate 23' will pivot the chain 21, the center plate 23 and gear 22' downward out of the housing through the open bottom 28'''' about the axis of pin 26 from its storage position as shown in phantom lines 27, to its position shown in solid lines in Figure 1 when the chain saw is being operated or used, and the mounting plate 23' pivots them back upward about its axis pin 26 back to its storage position as shown in phantom lines 27.

A hydraulic piston and cylinder 29 powers the pivoting movement of the mounting plate 23 about pin 26'. The hydraulic piston and cylinder 29 is mounted in the housing 28 with the cylinder 29' pivotally mounted to the housing wall 28' at pivot point 30, and with the piston 29'' pivotally mounted to the mounting plate 23' at pivot point 25. Consequently, the telescoping of the piston 29'' hydraulically pivots the mounting plate 23' and the mounting plate pivots the center plate 23 the gears and endless chain clockwise about the pin 26 downward out of the housing to their operative position as shown in solid lines in Figure 1. The hydraulic retracting of the piston back into the cylinder, pivots the center plate, gears and cutting chain counterclockwise up about pin 26 into the housing 28 to their position shown in phantom lines for storage.

The rear end assembly 31 of the chain saw apparatus 20 has an L shape arm 32' with it rear leg 32' rectangular in shape. The rear leg 32' is slidably inserted and detachably mounted to the forward end of sleeve 33 by a pin 33'' of a telescoping boom assembly 34 of a mobile vehicle 35, so that the chain saw apparatus 20 may be operated by the mobile vehicle 35.

The telescoping boom assembly 34 has three telescoping booms or sleeves 33, 36 and 37. The sleeves 36 and 37 are powered in their telescoping action, powered hydraulically by piston and cylinders 38 and 39 which telescope the booms 36 and 37 respectively in and out, with boom 36 telescoping in and out of sleeve 40.

cutting chain 21 and teeth 21', as well as the mounting plate 23, gears 22 and 22', motor 24, and hydraulic piston and cylinder as well as the other components of the front assembly, is mounted to the shaft 46.

Consequently, since the forward end of the shaft 46 is fixed to the front assembly 28, pivoting or rotating the shaft 46 in the sleeve 47 of the L shaped arm 32, pivots or rotates the entire front housing assembly 28, including the housing walls, mounting plate 23 and plate 23', chain 21, motor 24, piston and cylinder 29 with the shaft 46 in the sleeve of the L shaped arm about the axis 46' of the shaft 46, so that the rotation of the shaft 46 in the sleeve 47 rotates the entire front housing assembly including the aforementioned components, relative to the rear assembly 31.

The axis of rotation 46' of the front assembly 28 is perpendicular to the axis of pin 26. The rotation about the axis 46' acts to pivot the entire front assembly including the chain 21 at different angles, such as shown in phantom lines 46'' in Figure 6; while axis of rotation about pin 26 pivots the cutting chain 21 and teeth in and out of the housing of the front assembly about the second axis.

The shaft 46 of the rear assembly 31 has a rear flange 48 and a small gear 48' fixed axially to the shaft and a projects rearward. A conventional motor 49 has a center recess with conventional planetary gears surrounding the center recess to receive the small gear axially therein and mesh with the planetary gears of the motor, so that operating the motor 49 rotates the planetary gears which rotates the small gear 48 which rotates the shaft 46' about its center axis 46 which rotates the entire front assembly 28 about the center axis 46' relative to the rear assembly 31. The housing 49' of the motor 49 is fixed to the plate 50 of the L shaped arm 32 of the rear assembly.

A fluid reservoir 51 is fixedly mounted to the top of the front assembly 28 of the chain saw and also rotates with the front assembly about the shaft 46'. The fluid reservoir provides lubricating oil for the chain 21. The hydraulic fluid for operating the hydraulic motors 24, piston and cylinder 29, and motor 49 comes from the mobile vehicle 35.

In order to lengthen the chain saw assembly 20 further on the booms to further different lengths, the fourth boom 33, to which the L shaped arm of the rear assembly of the chain saw assembly 20 is inserted, can be adjusted manually by being telescoped in and out of sleeve 37 by raising and removing the spring loaded pin 37'' to remove the pin from one of a series of bores in sleeve 37 along its length, which lock the boom 33 to sleeve 37 and sliding the boom 33 further out and releasing the pin with the

spring reinserting the pin in a bore in sleeve 37 further along the length of sleeve 37.

The rear end of sleeve 40 of the sleeve or boom assembly is fixed to the lateral frame 42. The lateral frame 42 is pivotally mounted to the pair of arms 43 and 44 of the mobile vehicle 35. The mobile vehicle 35 has a pair of arms 43 and 44 which are pivotally mounted at their other ends to the mobile vehicle 45 at pivot points 45'. Hydraulic pistons and cylinders 48 on each side of the vehicle are pivotally connected between the arms and the vehicle so that telescoping actuation of the piston and cylinder 46 pivots the arms upward relative to the mobile vehicle, thereby pivoting and raising the telescoping boom and power chain saw 20 upward about the axis of the arms in their connection to the vehicle. The hydraulic pistons and cylinders 48 are pivotally connected between the arms of the vehicle and the sleeve 40 of the telescoping boom so that actuation of the pistons and cylinders 48 acts to telescope their pistons 48' which pivots telescoping boom and power chain saw upward and downward about the axis of the arms pivotal connection to the rear end of the telescoping boom.

Operation:

The remote controlled chain saw apparatus 20 can be operated by controls in the mobile vehicle and can be moved to various positions for cutting objects, such as tree branches, by moving the chain saw apparatus forward and upward by the telescoping booms; and or pivoting the chain saw to an angle relative to the boom by operating hydraulically the piston and cylinder 29 and the hydraulic motor 49, respectively, from the cab of the mobile vehicle and then, pivoting the chain saw apparatus upward or downward at the forward end of the boom about the pivotal connection 51 of the stationary boom 40 to the frame .

The cylinder 52" of the piston and cylinder 52 is pivotally mounted between the forward portions of the arms 43 and 44 and the piston 52' is pivotally mounted to a frame 53 at pivot point 54. The frame 53 is fixed to rear end of the boom 40, so that hydraulically actuating the piston and cylinder 52 to telescope the piston 52' pivots, about pivot the boom 40, as well as the entire boom assembly and the front and rear assemblies as well as the saw 20 about the pivotal connection 54' of the frame 42 to the arms 43 and 44.

If for example, the remote controlled saw invention 20 is being used to cut branches off of trees, the saw 20 will be elevated by telescoping the pistons 48' of the pistons and cylinders on each side

the vehicle 35 to pivot the arms 43 and 44 of the vehicle 35 upward about their pivot connection 45' to the vehicle to place the saw at an upward angle, pointing the tip of the saw toward the branch to be cut. The piston 52' may also be activated to hydraulically telescope to pivot the boom assembly and front and rear saw assembly about the pivotal connection 54 at the forward ends of the arms of the vehicle to pivot the saw at a more vertical angle if desired.

Depending upon the height of the branch, the pistons 38' and 39' may be telescoped hydraulically to telescope the saw invention up to further in height when necessary. The saw will initially be operated with the saw blade 21 pivoted upward into the housing 28' as shown in phantom lines 55.

When the saw has been telescoped upward sufficient to reach the branch of the tree to be cut, the operator will initially place the tip of the housing 28' above the branch to be cut, and pivot the saw forward about its pivotal connection of the booms to the vehicle until the bottom edge 56 of the saw housing rests at its upward angle against the branch to be cut with the saw blade remaining in the housing. Thereupon, the operator will activate the hydraulic motor 24 to cause the chain 21 to rotate on the gears 22 and 22'. The operator will also activate the hydraulic cylinder 29 to gradually telescope the piston 29' out of the cylinder 29", with the chain rotating the cutting blades 21' on the saw. The activation and telescoping of the piston 29 causes the saw blade to pivot gradually out of its housing about the pin 26, so that as the blade is pivoted outward from the housing, it will pivot against the branch and the rotating teeth 21' on the rotating chain will cut forward and downward into the branch to be cut and continue cutting forward and downward as the piston continued to telescope thereby continuing to pivot the blade forward and downward, until the teeth of the chain of the power saw cut completely through the branch to be cut.

If necessary, the saw may be pivoted at an angle to reach to proper cutting position by activating the motor 49, to pivot the front saw assembly 28 including the cutting blade 23 about the shaft 46, relative to the rear assembly 31. The saw and front assembly can be pivoted about the shaft 46 from its upright position as shown in solid lines nearly 180 degrees in either direction, for a total of nearly 360 degrees of angle selectivity.

Thus, the position of the cutting chain 21 of the chain saw 20 will change during the cutting of the branch, by the saw pivoting out from the housing about pin 26 by actuation of the hydraulic piston

